

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

Data Requirement:

PMRA Data Code: 9.8.4 (TGAI) or 9.8.6 (EP)
EPA DP Barcode: 409151
OECD Data Point: IIA 8.12 (TGAI) and IIIA 10.8.1.1 (EP)
EPA Guideline: 850.4100

Test material: Limonene

Purity: 70%

Common name


Chemical name: IUPAC:

CAS name:

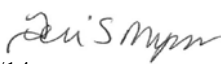
CAS No.:

Synonyms:

Primary Reviewer: Joan Gaidos
Environmental Scientist, CDM Smith

Signature: 
Date: 2/18/14

Secondary Reviewer: Teri S. Myers
Environmental Scientist, CDM Smith

Signature: 
Date: 03/05/14

Primary Reviewer: Katherine Stebbins
EPA/OPP/ERB3

Date: 09/09/14 

EPA PC Code 079701

Date Evaluation Completed: 09/09/14

CITATION: Younger, C. 2012. Avenger Weed Killer Concentrate Terrestrial Plant Toxicity, Seedling Emergence. Unpublished study performed by Stillmeadow, Inc., Sugar Land, Texas. Laboratory Project Number: 16473-12. Study sponsored by Cutting Edge Formulation, Buford, Georgia. Study completed January 13, 2013.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the acute toxicity of a pesticide to terrestrial vascular plants. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study.

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EXECUTIVE SUMMARY:

The effect of **Avenger Weed Killer Concentrate (d-limonene, 70%)** on the seedling emergence of monocot (corn, *Zea mays*; onion, *Allium cepa*; ryegrass, *Lolium perenne*; and oat, *Avena sativa*) and dicot (cabbage, *Brassica oleracea*; carrot, *Daucus carota*; cucumber, *Cucumis sativus*; soybean, *Glycine max*; lettuce, *Lactuca sativa*; and tomato, *Lycopersicon esculentum*) crops was studied at a nominal concentration of 0 (negative), 17, 33, 66, 133 and 265 lb ai/A. Measured concentration for tomato and cucumber were 17, 33, 66, 133, and 265 lb ai/A; cabbage were 18, 37, 73, 146, and 292 lb ai/A; lettuce soybean and ryegrass were 20, 40, 80, 159, and 318 lb ai/A; and carrot, oat, corn and onion were 22, 43, 86, 172 and 345 lb ai/A.

The growth medium used in the seedling emergence test was peat pellets (not characterized). On day 14 the surviving plants per pot were recorded and cut at soil level for measuring the plant height and dry weight.

Negative control emergence ranged from 85 to 100%. Onion had significant inhibition in emergence of 35% in the 43 lb ai/A test level compared to the negative control ($p < 0.05$). However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels. All other species had no significant effect on emergence.

The study author only reported observed mortality of emerged as part of the phytotoxicity scores, but did not statistically analyze survival. The reviewer's definition of survival was the number survived of the total number planted, however, since all seedlings that emerged, survived, emergence and survival are the same.

There was a significant reduction of 12% in cucumber height at the 66 lb ai/A measured test level and of 24% in soybean at the 80 lb ai/A measured test level compared to the negative controls (Dunnett's Multiple Comparison test; $p < 0.05$). However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels. There were no other significant effects on height.

There were no significant effects on weight for any species at any treatment level.

Although NOEC and ECx values were obtained for some species and endpoints, the responses were not dose-dependent and the 95% confidence intervals were either not reliable or not calculable. Therefore, the responses were not considered a valid reflection of a dose-response. The most sensitive monocot and dicot species could not be determined due to a lack of toxicity with NOAEC and EC₂₅ values of ≥ 265 -345 lb ai/A and > 265 -345 lb ai/A, respectively.

Based on the phytotoxicity rating system used by the study author, there were only a few scattered effects on individual plants, with no overall or significant trends. Therefore, there were no significant effects on negative controls or at any treatment level for any of the species studied.

Maximum Labeled Rate: Not reported

Results Synopsis

Most sensitive monocot: Could not be determined*

EC ₅₀ /IC ₅₀ : Could not be determined	95% C.I.: N/A
EC ₂₅ /IC ₂₅ : Could not be determined	95% C.I.: N/A
EC ₀₅ /IC ₀₅ : Could not be determined	95% C.I.: N/A
NOEC: ≥ 265 -345 lb ai/A	

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Slope: N/A

95% C.I.: N/A

Most sensitive dicot: Could not be determined*

EC₅₀/IC₅₀: Could not be determined

95% C.I.: N/A

EC₂₅/IC₂₅: Could not be determined

95% C.I.: N/A

EC₀₅/IC₀₅: Could not be determined

95% C.I.: N/A

NOEC: ≥265-345 lb ai/A

Slope: N/A

95% C.I.: N/A

*Although NOEC and ECx values were obtained for some species and endpoints, the responses were not dose-dependent and the 95% confidence intervals were either not reliable or not calculable. Therefore, the responses were not considered a valid reflection of a dose-response.

This toxicity study is classified as ACCEPTABLE and satisfies the guideline requirement for a terrestrial plant toxicity study.

Table 1 (Tier II studies). Summary of most sensitive parameters by species (lbs ai/A).

Species	Endpoint	NOEC	EC ₀₅	EC ₂₅	EC ₅₀
Cabbage	None	≥292	>292	>292	>292
Carrot	None	≥345	>345	>345	>345
Corn	None	≥345	>345	>345	>345
Cucumber*	Height	33	10.9	2110000	>265
Lettuce	None	≥318	>318	>318	>318
Oat	None	≥345	>345	>345	>345
Onion*	Emergence	22	>345	>345	>345
Ryegrass	None	≥318	>318	>318	>318
Soybean*	Height	40	17.8	2700	>318
Tomato	None	≥265	>265	>265	>265

* The response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values are unreliable.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED:

This study was conducted in compliance with OCSPP 850.4100: Terrestrial Plant Toxicity, Tier I (Seedling Emergence), April 1996. The reviewer evaluated the study methods according to EPA Ecological Effects Test Guidelines, OCSPP Guideline 850.4100: Seedling Emergence and Seedling Growth. Deviations were noted by the reviewer.

1. The study was conducted using peat pellets, which were not characterized. U.S.EPA guidance prefers the study be conducted using a soil that is adequately characterized.
2. The physiochemical properties of the test material were not reported.
3. The purity of the test material active ingredient was not confirmed.
4. The maximum label rate for Avenger Weed Killer Concentrate (70% d-limonene) was not reported.
5. Germination rates were not reported. USEPA recommends germination rates of 70% or higher.

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The deficiency and deviations did not have an impact on the acceptability of this study.

COMPLIANCE:

Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. This study was conducted in compliance with FIFRA Good Laboratory Practice Standards as published by the U.S. EPA, 40 CFR Part 160 (1989).

A. MATERIALS:

1. Test Material

Avenger Weed Killer Concentrate (d-limonene, 70%)

Description:

Slightly yellow liquid

Lot No./Batch No.:

B186

Purity:

70% (purity was not confirmed).

Stability of compound under test conditions:

Analytical determinations based on measured concentration of the test material in the spray solution was not reported. Stability was not reported.

(OECD recommends chemical stability in water and light)

Storage conditions of test chemicals:

The test material was stored at room temperature.

Table 2. Physical/chemical properties of Avenger Weed Killer Concentrate (Limonene).

Parameter	Values	Comments
Water solubility at 20°C	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

2. Test organism: The variety of each species used was not reported.

Monocotyledonous species: Corn (*Zea mays*, Poaceae; Illini Xtra-Sweet), Onion (*Allium cepa*, Liliaceae; Cipponlina Borretana), Ryegrass (*Lolium perenne*, Poaceae; Perennial ryegrass), and Oat (*Avena sativa*, Poaceae; Hulless oats); *EPA recommends four monocots in two families, including corn.*

Dicotyledonous species: Carrot (*Daucus carota*, Apiaceae; Big Top), Cabbage (*Brassica oleracea*,

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Brassicaceae; Brunswick), Soybean (*Glycine max*, Fabaceae; Green soybean), Lettuce (*Lactuca sativa*, Asteraceae; Iceberg A), Tomato (*Lycopersicon esculentum*, Solanaceae; Burpees Big Boy Hybrid), and Cucumber (*Cucumis sativus*, Cucurbitaceae; Straight Eight); *EPA recommends six dicots in four families, including soybean and a root crop.*

OECD recommends a minimum of three species selected for testing, at least one from each of the following categories: Category 1: ryegrass, rice, oat, wheat, and sorghum; Category 2: mustard, rape, radish, turnip, and Chinese cabbage; Category 3: vetch, mung bean, red clover, fenugreek, lettuce, and cress.

Seed source: Onion, corn, carrot, cabbage, lettuce, cucumber and tomato obtained from Burpee Seed Company; Soybean obtained from Johnny's Select Seeds; Oat obtained from Sprout People; and Perennial ryegrass obtained from Pennington Seed Inc.

Prior seed treatment/sterilization: The seeds were not treated with any type of fungicides, insecticides, or any pesticides.

Historical % germination of seed: Germination rates were not reported.

Seed storage, if any: Not reported.

B. STUDY DESIGN:

1. Experimental Conditions

- a. Limit test: None.
- b. Range-finding study: None.
- c. Definitive Study

Table 3: Experimental Parameters - Seedling Emergence.

Parameters	Seedling Emergence	
	Details	Remarks
		<i>Criteria</i>
Duration of the test	14 days	
		<i>Recommended test duration is 14-21 days.</i> <i>OECD recommends that the test be terminated no sooner than 14 days after 50 percent of the control seedlings have emerged</i>

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Parameters	Seedling Emergence	
	Details	Remarks
		<i>Criteria</i>
Number of seeds/plants/species/replicate	One peat pellet with 1 seed per pellet; 40 total peat pellets per treatment rate. For analysis purposes, the study author grouped the peat pellets in groups 10 peat pellets, creating 4 replicates of 10 seeds each per treatment rate.	<p><i>Ten seeds per replicate should be used.</i></p> <p><i>OECD recommends a minimum of five seeds planted in each replicate within 24 hours of incorporation of the test substance. All seeds of each species for each test should be of the same size class. The seed should not be imbibed.</i></p>
<u>Number of replicates</u> Control: Adjuvant control: Treated:	4 N/A 4	<p><i>Four replicates per dose should be used.</i></p> <p><i>OECD recommends a minimum of four replicates per treatment</i></p>
<u>Test concentrations (lb ai/A)</u> Nominal: Measured:	0 (negative control), 17, 33, 66, 133 and 265 lbs ai/A Tomato and cucumber: 0 (negative control), 17, 33, 66, 133 and 265 lbs ai/A. Cabbage: 0 (negative control), 18, 37, 73, 146 and 292 lbs ai/A. Lettuce, soybean and ryegrass: 0 (negative control), 20, 40, 80, 159 and 318 lbs ai/A. Carrot, oat, corn and onion: 0 (negative control), 22, 43, 86, 172 and 345 lbs ai/A.	<p><i>Five test concentrations should be used with a dose range of 2X or 3X progression</i></p> <p><i>OECD recommends three concentrations, preferably with application rates equivalent to 0.0 (control), 1.0, 10.0 and 100 mg substance per kg of oven-dried soil.</i></p>
<u>Method and interval of analytical verification</u> LOQ: LOD:	Not reported. N/A N/A	
Adjuvant (type, percentage, if used)	N/A	

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Parameters	Seedling Emergence	
	Details	Remarks
		<i>Criteria</i>
<u>Test container (pot)</u> Size/Volume Material: (glass/polystyrene)	Saturated peat pellets expanded to ca. 4.5 x 5 cm. Forty peat pellets per tray; trays were ca. 30 x 54 cm. Plastic net	 <i>Non-porous containers should be used.</i> <i>OECD recommends that non-porous plastic or glazed pot be used.</i>
Growth facility	Hoods with time controlled light cycles.	
Method/depth of seeding	Not reported.	
<u>Test material application</u> Application time including the plant growth stage Number of application Application interval Method of application	After planting. 1 N/A- single application The test material diluted in tap water was applied over the seed pellets in each tray (not further described).	
<u>Details of soil used</u> Geographic location Depth of soil collection Soil texture % sand % silt % clay pH: % organic carbon CEC Moisture at 1/3 atm (%)	N/A N/A Peat Pellets Not reported Not reported Not reported 6.12 Not reported Not reported Not reported	Jiffy Peat Pellets; Mfg by Jiffy Products LTD, Shippagan, NB, Canada. Organic matter: Not reported <i>Soil mixes containing sandy loam, loam, or clay loam soil with no greater than 2% organic matter are preferable. Glass beads, rock wool, and 100% acid washed sand are not preferred.</i> <i>OECD prefers the soil to be sieved (0.5 cm) to remove coarse fragments. Carbon content should not exceed 1.5% (3% organic matter). Fine particles (under 20um) makeup should be between 10 and 20%. The recommended pH is between 5.0 and 7.5.</i>

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Parameters	Seedling Emergence	
	Details	Remarks
		Criteria
Details of nutrient medium, if used	N/A	
<u>Watering regime and schedules</u> Water source/type: Volume applied: Interval of application: Method of application:	Tap water (not characterized) 2 minutes at rate of 1.89L/hr. Daily. Automatic sprinkler.	<i>EPA prefers that bottom watering be utilized for seedling emergence studies so that the chemical is not leached out of the soil during the test.</i>
Any pest control method/fertilization, if used	None reported	
<u>Test conditions</u> Temperature: Photoperiod: Light intensity and quality: Relative humidity:	19-23°C 16L:8D Full spectrum grow lights. 665-1710 Lux 33-93%	<i>EPA prefers that the cold vs warm loving plants be tested in two separate groups to optimize plant growth.</i> <i>OECD prefers that the temperature, humidity and light conditions be suitable for maintaining normal growth of each species for the test period.</i>
<u>Reference chemical (if used)</u> Name: Concentrations:	N/A	
Other parameters, if any	None	

2. Observations:

Table 4: Observation Parameters - Seedling Emergence.

Parameters	Seedling Emergence	
	Details	Remarks
Parameters measured (e.g., number of germinated seeds, emerged)	- Emergence - Survival - Height	The study author also measured plant diameter.

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seedlings, plant height, dry weight or other endpoints)	- Dry weight - Phytotoxicity	
Measurement technique for each parameter	Emergence, survival and phytotoxicity were visually determined. Height measurement was not described. Seedlings were placed in drying oven by replicate until dried and dry weight recorded for each replicate (not further defined).	
Observation intervals	Each pot was inspected daily and phytotoxicity assessments performed. Plant height and dry weight were recorded at study termination.	
Other observations, if any	N/A	
Were raw data included?	Yes	
Phytotoxicity rating system, if used	0- Normal, healthy; 1- localized discoloration; 2 – widespread (<50%) discoloration of plants and/or leaves; 3- widespread (>50%) discoloration, some signs of wilting; 4 – Plant/leaves mostly brown, noticeable wilting and necrosis; 5 – Plant dead, completely brown and wilted and necrotic.	

II. RESULTS and DISCUSSION:

A. INHIBITORY EFFECTS:

1. Seedling Emergence:

Negative control emergence ranged from 85 to 100%. Onion had significant inhibition in emergence of 35% in the 1.0% group (33 lb ai/A) compared to the negative control ($p < 0.05$). However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels. All other species had no significant effect on emergence. The reviewer found similar results.

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The study author only reported observed mortality of emerged, but did not statistically analyzed survival. The reviewer's definition of survival was the number survived of the total number planted, however, since all seedlings that emerged, survived, emergence and survival are the same.

There was a significant reduction in height for cucumber at the nominal 0.5% group level (17 lb ai/A) and for soybean at the nominal 2.0% group level (66 lb ai/A) compared to the negative control (ANOVA with Tukey's; $p < 0.0001$). However, in both cases the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels. The reviewer found slightly different results with significant reductions of 12% in cucumber at the 66 lb ai/A measured test level and of 24% in soybean at the 80 lb ai/A measured test level compared to the negative controls (Dunnett's Multiple Comparison test; $p < 0.05$). The reviewer results also lacked a dose-response. There were no other significant effects on height.

There were no significant effects on weight for any species at any treatment level, with the exception of significant promotion in oat dry weight at the 4% group level (133 lb ai/A).

The most sensitive monocot and dicot species, based on the study author's results, could not be determined due to a lack of toxicity with NOAEC and EC₂₅ values of 265 and >265 lb ai/A, respectively.

Based on the phytotoxicity rating system used by the study author, there were only a few scattered effects on individual plants, with no overall or significant trends. Therefore, there were no significant effects on negative controls or at any treatment level for any of the species studied.

B. REPORTED STATISTICS:

Replicate shoot length, dry weight, phytotoxicity scores and emergence were analyzed (GraphPad InStat version 3.06 for Windows 95). Phytotoxicity ratings were converted to percent using the arcsin method prior to statistical comparison. All datasets were further analyzed using ANOVA with Tukey's for phytotoxicity scores, dry weights and height. Emergence was analyzed by assigning a value of 1 (emerged) or 0 (not emerged) to each plant and compared all groups within each species using nonparametric ANOVA with Kruskal-Wallis test and Dunnett's Comparison Test. All calculations were based on nominal application rates and percent inhibitions calculated based on the negative control.

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Table 5: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for biomass (lbs ai/A)									
	weight (g)	NOEC	EC ₀₅	95% CI	EC ₂₅	95% CI	EC ₅₀	95% CI	slope	95% CI
Cabbage	0.0244-0.0344	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Carrot	0.00412-0.00527	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Corn	0.0711-0.112	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Cucumber	0.115-0.142	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	0.0201-0.0329	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Oat	0.0499-0.0665	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Onion	0.00295-0.00373	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Ryegrass	0.00995-0.0124	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Soybean	0.269-0.344	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Tomato	0.0127-0.0171	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

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Table 5a: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for height (lbs ai/A)									
	height (cm)	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	5.25-5.78	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Carrot	4.8-5.55	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Corn	18-19.3	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Cucumber ¹	5.82-6.65	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
Lettuce	5.35-6.15	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Oat	25.3-27.3	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Onion	5.73-6.82	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Ryegrass	15.6-18.1	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Soybean ²	12.9-18	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
Tomato	4.93-5.3	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

1 There was a significant reduction at the 17 lb ai/A test level compared to the negative control, reported by the study author as the 1.0% group (ANOVA with Tukey's; p<0.0001); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values were not reported.

2 There was a significant reduction at the 66 lb ai/A test level compared to the negative control, reported by the study author as the 2.0% group (ANOVA with Tukey's; p<0.0001); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values were not reported.

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Table 5b: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for survival (lbs ai/A)									
	%	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Carrot	78-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Corn	88-98	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Cucumber	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Oat	88-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Onion ¹	55-85	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
Ryegrass	93-95	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Soybean	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Tomato	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

¹ The study author did not statistically analyze survival. However, survival was the same as emergence, and would follow the same pattern of significance.

Table 5c: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for emergence (lbs ai/A)									
	%	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Carrot	78-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Corn	88-98	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

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Species	Results summary for emergence (lbs ai/A)									
	%	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cucumber	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Oat	88-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Onion ¹	55-85	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
Ryegrass	93-95	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Soybean	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Tomato	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined, NC- Not calculable.

¹ There was a significant reduction at the 33 lb ai/A test level compared to the negative control, reported by the study author as the 1% group (Kruskal-Wallis and Dunn's Comparison test; p<0.05); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values were not reported.

Mid-study emergence											
Control	Cabbage	Carrot	Corn	Cucumber	Lettuce	Oat	Onion	Rye	Soybean	Tomato	Formulation Blank
Not reported											NA

Plant Injury Index*											
Control	Cabbage	Carrot	Corn	Cucumber	Lettuce	Oat	Onion	Rye	Soybean	Tomato	Formulation Blank
0-4	0	0-5	0-5	0	0	0	0-3	0	0-4	0-2	NA

0- Normal, healthy; 1- localized discoloration; 2 – widespread (<50%) discoloration of plants and/or leaves; 3- widespread (>50%) discoloration, some signs of wilting; 4 – Plant/leaves mostly brown, noticeable wilting and necrosis; 5 – Plant dead, completely brown and wilted and necrotic; DNE – Did not emerge.

C. VERIFICATION OF STATISTICAL RESULTS BY THE REVIEWER:

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

All analyses were conducted comparing treated to the negative control. These analyses were conducted using CETIS version 1.8.7.12 and backend settings approved for use by EFED on 5/31/13. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests, and data that did not satisfy these assumptions were subjected to the non-parametric MannWhitney-U and Jonckheere's tests. Measured concentrations were used for all analyses.

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

Table 6: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for height (lbs ai/A)									
	height (cm)	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	5.25-5.78	≥292	>292	N/A	>292	N/A	>292	N/A	N/A	N/A
Carrot	4.8-5.55	≥345	0.0445	N/A-1.36x10 ¹⁵	>345	N/A	>345	N/A	N/A	N/A
Corn	18-19.3	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Cucumber ¹	5.82-6.65	33	10.9	0.00024-658	2110000	N/A-9.3x10 ¹⁵	>265	N/A	N/A	N/A
Lettuce	5.35-6.15	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Oat	25.3-27.3	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Onion	5.73-6.82	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Ryegrass	15.6-18.1	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Soybean ²	12.9-18	40	17.8	N/A-221	2700	N/A-267000	>318	N/A	N/A	N/A
Tomato	4.93-5.3	≥265	808	N/A-840000	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

1 There was a significant reduction of 12% at the 66 lb ai/A test level compared to the negative control (Dunnett's test; p<0.05); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values are unreliable.

2 There was a significant reduction of 24% at the 80 lb ai/A test level compared to the negative control (Dunnett's test; p<0.05); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values are unreliable.

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

Table 6a: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for biomass (lbs ai/A)									
	weight (g)	NOEC	EC ₀₅	95% CI	EC ₂₅	95% CI	EC ₅₀	95% CI	slope	95% CI
Cabbage	0.0244-0.0344	≥292	>292	N/A	>292	N/A	>292	N/A	N/A	N/A
Carrot	0.00412-0.00527	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Corn	0.0711-0.112	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Cucumber	0.115-0.142	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	0.0201-0.0329	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Oat	0.0499-0.0665	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Onion	0.00295-0.00373	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Ryegrass	0.00995-0.0124	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Soybean	0.269-0.344	≥318	61	N/A-267	1630	N/A-126000	>318	N/A	N/A	N/A
Tomato	0.0127-0.0171	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

Table 6b: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for emergence (lbs ai/A)									
	%	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	95-100	≥292	>292	N/A	>292	N/A	>292	N/A	N/A	N/A
Carrot	78-100	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Corn	88-98	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Cucumber	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	98-100	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Oat	88-100	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Onion ¹	55-85	22	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Ryegrass	93-95	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Soybean	95-100	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Tomato	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

¹ There was a significant reduction of 35% at the 43 lb ai/A test level compared to the negative control (Dunnett's test; p<0.05); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values are unreliable.

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

Table 6c: Effect of Limonene on 14-Day Seedling Emergence

Species	Results summary for survival (lbs ai/A)									
	%	NOEC	EC ₀₅	95%CI	EC ₂₅	95%CI	EC ₅₀	95%CI	slope	95%CI
Cabbage	95-100	≥292	>292	N/A	>292	N/A	>292	N/A	N/A	N/A
Carrot	78-100	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Corn	88-98	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Cucumber	98-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A
Lettuce	98-100	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Oat	88-100	≥345	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Onion ¹	55-85	22	>345	N/A	>345	N/A	>345	N/A	N/A	N/A
Ryegrass	93-95	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Soybean	95-100	≥318	>318	N/A	>318	N/A	>318	N/A	N/A	N/A
Tomato	95-100	≥265	>265	N/A	>265	N/A	>265	N/A	N/A	N/A

ND- Not determined. NC- Not calculable.

¹ There was a significant reduction of 35% at the 43 lb ai/A test level compared to the negative control (Dunnett's test; p<0.05); However, the response was not dose-dependent and was not consistent across other endpoints and/or other treatment levels; NOEC and/or ECx values are unreliable.

Mid-study emergence

Control	Cabbage	Carrot	Corn	Cucumber	Lettuce	Oat	Onion	Rye	Soybean	Tomato	Formulation Blank
Not reported											NA

Plant Injury Index*

Control	Cabbage	Carrot	Corn	Cucumber	Lettuce	Oat	Onion	Rye	Soybean	Tomato	Formulation Blank

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

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Plant Injury Index*											
0-4	0	0-5	0-5	0	0	0	0-3	0	0-4	0-2	NA

0- Normal, healthy; 1- localized discoloration; 2 – widespread (<50%) discoloration of plants and/or leaves; 3- widespread (>50%) discoloration, some signs of wilting; 4 – Plant/leaves mostly brown, noticeable wilting and necrosis; 5 – Plant dead, completely brown and wilted and necrotic; DNE – Did not emerge.

Most sensitive monocot: Could not be determined

EC₅₀/IC₅₀: Could not be determined 95% C.I.: N/A
 EC₂₅/IC₂₅: Could not be determined 95% C.I.: N/A
 EC₀₅/IC₀₅: Could not be determined 95% C.I.: N/A
 NOEC: ≥265-345 lb ai/A
 Slope: N/A 95% C.I.: N/A

Most sensitive dicot: Could not be determined

EC₅₀/IC₅₀: Could not be determined 95% C.I.: N/A
 EC₂₅/IC₂₅: Could not be determined 95% C.I.: N/A
 EC₀₅/IC₀₅: Could not be determined 95% C.I.: N/A
 NOEC: ≥265-345 lb ai/A
 Slope: N/A 95% C.I.: N/A

D. STUDY DEFICIENCIES:

There were no study deficiencies.

E. REVIEWER'S COMMENTS:

The reviewer's and the study author's results for the most sensitive monocot and dicot were in general agreement. The reviewer's toxicity values are reported in the Executive Summary and Conclusions sections of this DER.

Although NOEC and ECx values were obtained for some species and endpoints, the responses were not dose-dependent and the 95% confidence intervals were either not reliable or not calculable. Therefore, the responses were not considered a valid reflection of a dose-response.

Data from ryegrass testing conducted on September 17 to October 5, 2012 was not used due to poor emergence.

The environmental conditions did not follow USEPA guideline specifications defined as: day temperature 25±6°C/night temperature 20±6°C, humidity 70±15% and lighting 350±50 µmol/m²/sec.

The in-life portion of the test was conducted from August 23 to November 5, 2012.

F. CONCLUSIONS:

Data Evaluation Record on the Acute Toxicity of Avenger Weed Killer Concentrate (a.i. d-limonene) to Terrestrial Vascular Plants: Seedling Emergence

PMRA Submission Number {.....}

EPA MRID Number 49044005

This toxicity study is classified as ACCEPTABLE and satisfies the guideline requirement for a terrestrial plant toxicity study. The most sensitive monocot and dicot species could not be determined due to a lack of toxicity with NOAEC and EC₂₅ values of ≥ 265 -345 lb ai/A and > 265 -345 lb ai/A, respectively.

Most sensitive monocot and EC₂₅: Could not be determined.

Most sensitive dicot and EC₂₅: Could not be determined.

III. REFERENCES:

None.

CETIS Summary Report

Report Date: 15 Feb-14 18:39 (p 1 of 3)
Test Code: 49044005 cabbag | 07-7145-1560

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)				Stillmeadow, Inc.	
Batch ID:	19-4980-4024	Test Type:	Seedling Emergence Tier II	Analyst:	
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:	
Ending Date:	14 Feb-14 14:28	Species:	Brassica oleracea	Brine:	
Duration:	540d 14h	Source:	Burpee, NC	Age:	
Sample ID:	08-7744-1009	Code:	49044005 cabbag	Client:	EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:	
Receive Date:	14 Feb-14 14:28	Source:	Cutting Edge Formulation		
Sample Age:	NA	Station:			

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-3464-1208	Mean Height	292	>292	NA	19.3%		Dunnett Multiple Comparison Test
12-7351-7868	Mean Weight	292	>292	NA	39.8%		Dunnett Multiple Comparison Test
12-9493-2408	Percent Emerged	292	>292	NA	6.27%		Mann-Whitney U Two-Sample Test
03-3072-2770	Percent Survived	292	>292	NA	6.27%		Mann-Whitney U Two-Sample Test

Point Estimate Summary							
Analysis ID	Endpoint	Level		95% LCL	95% UCL	TU	Method
11-6115-1280	Percent Emerged	EC5	19.4	N/A	N/A		Linear Regression (MLE)
		EC10	12.4	N/A	N/A		
		EC25	5.84	N/A	N/A		
		EC50	2.54	N/A	N/A		
11-6028-6439	Percent Survived	EC5	19.4	N/A	N/A		Linear Regression (MLE)
		EC10	12.4	N/A	N/A		
		EC25	5.84	N/A	N/A		
		EC50	2.54	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 18:39 (p 2 of 3)
 Test Code: 49044005 cabbag | 07-7145-1560

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence) Stillmeadow, Inc.

Mean Height Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.25	3.75	6.75	4.1	6.4	0.47	0.94	17.9%	0.0%
18		4	5.4	4.75	6.05	5	5.8	0.204	0.408	7.56%	-2.86%
37		4	5.78	4.8	6.75	4.9	6.2	0.307	0.613	10.6%	-10.0%
73		4	5.75	5.21	6.29	5.3	6.1	0.171	0.342	5.94%	-9.52%
146		4	5.28	4.19	6.36	4.6	6	0.34	0.68	12.9%	-0.48%
292		4	5.5	4.93	6.07	5	5.8	0.178	0.356	6.47%	-4.76%

Mean Weight Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.0244	0.0144	0.0343	0.0154	0.0296	0.00312	0.00624	25.6%	0.0%
18		4	0.0257	0.0199	0.0316	0.0205	0.029	0.00184	0.00369	14.3%	-5.58%
37		4	0.0297	0.0222	0.0371	0.0242	0.0339	0.00234	0.00467	15.7%	-21.8%
73		4	0.0303	0.0251	0.0356	0.0264	0.0331	0.00165	0.00329	10.8%	-24.5%
146		4	0.0263	0.0162	0.0364	0.0207	0.0354	0.00316	0.00632	24.0%	-7.9%
292		4	0.0344	0.0211	0.0476	0.0226	0.0421	0.00416	0.00832	24.2%	-41.1%

Percent Emerged Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
18		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	5.0%
37		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
73		4	1	1	1	1	1	0	0	0.0%	0.0%
146		4	1	1	1	1	1	0	0	0.0%	0.0%
292		4	1	1	1	1	1	0	0	0.0%	0.0%

Percent Survived Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
18		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	5.0%
37		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
73		4	1	1	1	1	1	0	0	0.0%	0.0%
146		4	1	1	1	1	1	0	0	0.0%	0.0%
292		4	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 18:39 (p 3 of 3)
Test Code: 49044005 cabbag | 07-7145-1560

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.1	6.4	5.2	5.3
18		5.1	5.8	5.7	5
37		6.2	6.2	5.8	4.9
73		5.7	6.1	5.9	5.3
146		6	5.7	4.8	4.6
292		5.5	5.8	5	5.7

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.0154	0.0296	0.0272	0.0253
18		0.0263	0.029	0.0272	0.0205
37		0.0339	0.0332	0.0273	0.0242
73		0.0288	0.0331	0.033	0.0264
146		0.0354	0.024	0.0251	0.0207
292		0.0421	0.0365	0.0226	0.0364

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
18		1	1	1	0.8
37		1	0.9	1	1
73		1	1	1	1
146		1	1	1	1
292		1	1	1	1

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
18		1	1	1	0.8
37		1	0.9	1	1
73		1	1	1	1
146		1	1	1	1
292		1	1	1	1

CETIS Summary Report

Report Date: 15 Feb-14 18:41 (p 1 of 3)

Test Code: 49044005 carrot | 14-1594-2706

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Batch ID: 09-1143-4495 **Test Type:** Seedling Emergence Tier II **Analyst:**
Start Date: 23 Aug-12 **Protocol:** OCSPP 850.4100 Plant Seedling Emergen **Diluent:**
Ending Date: 14 Feb-14 15:13 **Species:** Daucus carota **Brine:**
Duration: 540d 15h **Source:** Burpee, NC **Age:**

Sample ID: 16-3060-9920 **Code:** 49044005 carrot **Client:** EPA OCSPP EFED
Sample Date: 23 Aug-12 **Material:** Limonene **Project:**
Receive Date: 14 Feb-14 15:13 **Source:** Cutting Edge Formulation
Sample Age: NA **Station:**

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-3442-8166	Mean Height	345	>345	NA	15.3%		Dunnett Multiple Comparison Test
05-6220-0527	Mean Weight	345	>345	NA	23.4%		Dunnett Multiple Comparison Test
12-8793-3450	Percent Emerged	345	>345	NA	NA		Jonckheere-Terpstra Step-Down Test
09-6214-3778	Percent Emerged	22	43	30.76	13.1%		Mann-Whitney U Two-Sample Test
20-4973-8772	Percent Survived	345	>345	NA	NA		Jonckheere-Terpstra Step-Down Test
10-5575-0463	Percent Survived	22	43	30.76	12.6%		Mann-Whitney U Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level		95% LCL	95% UCL	TU	Method
14-4997-4297	Mean Height	IC5	0.0445	N/A	1.36E+15		Nonlinear Regression
		IC10	10900	N/A	7.84E+17		
		IC25	11100000	N/A	N/A		
		IC50	1.12E+23	N/A	N/A		
03-1821-7569	Percent Emerged	EC5	63100	N/A	N/A		Linear Regression (MLE)
		EC10	1730	N/A	N/A		
		EC25	4.25	N/A	N/A		
		EC50	0.00536	N/A	N/A		
12-6145-3283	Percent Survived	EC5	2230000	N/A	N/A		Linear Regression (MLE)
		EC10	12200	N/A	N/A		
		EC25	2.01	N/A	N/A		
		EC50	0.000126	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 18:41 (p 2 of 3)
 Test Code: 49044005 carrot | 14-1594-2706

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.45	4.5	6.4	4.7	6.1	0.299	0.597	11.0%	0.0%
22		4	5.28	4.6	5.95	4.7	5.6	0.214	0.427	8.1%	3.21%
43		4	5.23	4.62	5.83	4.9	5.6	0.189	0.377	7.22%	4.13%
86		4	4.8	4.05	5.55	4.2	5.3	0.235	0.469	9.77%	11.9%
172		4	5.2	4.28	6.12	4.5	5.9	0.289	0.577	11.1%	4.59%
345		4	5.55	4.84	6.26	5	6	0.222	0.443	7.99%	-1.83%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.00459	0.00351	0.00567	0.00373	0.00533	0.00034	0.000681	14.8%	0.0%
22		4	0.00435	0.00324	0.00546	0.00337	0.00496	0.00035	0.0007	16.1%	5.23%
43		4	0.00476	0.00424	0.00528	0.00434	0.00513	0.000163	0.000326	6.85%	-3.64%
86		4	0.00412	0.00346	0.00477	0.00362	0.00462	0.000205	0.000411	9.98%	10.3%
172		4	0.00527	0.00397	0.00656	0.00461	0.0063	0.000408	0.000816	15.5%	-14.7%
345		4	0.00475	0.00364	0.00586	0.00381	0.00538	0.000349	0.000699	14.7%	-3.53%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
22		4	0.8	0.509	1	0.6	1	0.0913	0.183	22.8%	20.0%
43		4	0.775	0.695	0.855	0.7	0.8	0.025	0.05	6.45%	22.5%
86		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	12.5%
172		4	0.9	0.77	1	0.8	1	0.0408	0.0816	9.07%	10.0%
345		4	0.825	0.673	0.977	0.7	0.9	0.0479	0.0957	11.6%	17.5%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
22		4	0.8	0.509	1	0.6	1	0.0913	0.183	22.8%	20.0%
43		4	0.775	0.695	0.855	0.7	0.8	0.025	0.05	6.45%	22.5%
86		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	12.5%
172		4	0.85	0.758	0.942	0.8	0.9	0.0289	0.0577	6.79%	15.0%
345		4	0.825	0.673	0.977	0.7	0.9	0.0479	0.0957	11.6%	17.5%

CETIS Summary Report

Report Date: 15 Feb-14 18:41 (p 3 of 3)
Test Code: 49044005 carrot | 14-1594-2706

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.7	6.1	5.7	5.3
22		5.6	5.2	5.6	4.7
43		4.9	5.6	5.5	4.9
86		4.7	5	5.3	4.2
172		5.3	4.5	5.9	5.1
345		5.8	5.4	6	5

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.00373	0.00487	0.00533	0.00443
22		0.00496	0.00434	0.00473	0.00337
43		0.00473	0.00434	0.00513	0.00484
86		0.00416	0.00406	0.00462	0.00362
172		0.00461	0.00461	0.0063	0.00554
345		0.00538	0.00464	0.00518	0.00381

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
22		0.9	1	0.6	0.7
43		0.7	0.8	0.8	0.8
86		0.8	0.9	0.9	0.9
172		0.9	0.8	0.9	1
345		0.9	0.8	0.9	0.7

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
22		0.9	1	0.6	0.7
43		0.7	0.8	0.8	0.8
86		0.8	0.9	0.9	0.9
172		0.9	0.8	0.9	0.8
345		0.9	0.8	0.9	0.7

CETIS Summary Report

Report Date: 15 Feb-14 19:46 (p 1 of 1)
 Test Code: 49044005 corn | 14-8099-0822

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Batch ID: 18-9694-2415 Test Type: Seedling Emergence Tier II Analyst:
 Start Date: 23 Aug-12 Protocol: OCSPP 850.4100 Plant Seedling Emergen Diluent:
 Ending Date: 14 Feb-14 15:21 Species: Zea mays Brine:
 Duration: 540d 15h Source: Burpee, NC Age:

Sample ID: 07-6210-1419 Code: 49044005 corn Client: EPA OCSPP EFED
 Sample Date: 23 Aug-12 Material: Limonene Project:
 Receive Date: 14 Feb-14 15:21 Source: Cutting Edge Formulation
 Sample Age: NA Station:

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-8094-5479	Mean Height	345	>345	NA	15.5%		Dunnett Multiple Comparison Test
18-8939-2898	Mean Weight	345	>345	NA	41.2%		Dunnett Multiple Comparison Test
05-2576-7342	Percent Emerged	345	>345	NA	13.2%		Mann-Whitney U Two-Sample Test
06-8305-3357	Percent Survived	345	>345	NA	13.4%		Mann-Whitney U Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	95% LCL	95% UCL	TU	Method
01-0358-8006	Percent Emerged	EC5	351	N/A	N/A	Linear Regression (MLE)
		EC10	1080	N/A	N/A	
		EC25	7120	N/A	N/A	
		EC50	57700	N/A	N/A	

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	18.3	14.3	22.2	14.9	20.9	1.25	2.5	13.7%	0.0%
22		4	18	14.6	21.3	15.9	20.1	1.05	2.11	11.7%	1.64%
43		4	19	17.6	20.3	17.7	19.7	0.435	0.87	4.59%	-3.84%
86		4	18.4	16.1	20.7	16.4	19.9	0.726	1.45	7.9%	-0.69%
172		4	18.3	15.8	20.8	17.1	20.5	0.779	1.56	8.51%	-0.41%
345		4	19.3	18.1	20.4	18.6	20.1	0.362	0.723	3.76%	-5.48%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.0741	0.0428	0.106	0.048	0.0944	0.00986	0.0197	26.6%	0.0%
22		4	0.0711	0.0449	0.0973	0.053	0.0912	0.00824	0.0165	23.2%	4.04%
43		4	0.0956	0.0663	0.125	0.0727	0.117	0.0092	0.0184	19.3%	-28.9%
86		4	0.112	0.0925	0.132	0.0984	0.129	0.00628	0.0126	11.2%	-51.7%
172		4	0.102	0.0597	0.144	0.0766	0.13	0.0133	0.0266	26.1%	-37.6%
345		4	0.0995	0.0863	0.113	0.0881	0.108	0.00415	0.00829	8.34%	-34.2%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	0.0%
22		4	0.925	0.686	1	0.7	1	0.075	0.15	16.2%	2.63%
43		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-2.63%
86		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	0.0%
172		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	7.89%
345		4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	2.63%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%
22		4	0.925	0.686	1	0.7	1	0.075	0.15	16.2%	0.0%
43		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-5.41%
86		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	-2.7%
172		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	5.41%
345		4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:20 (p 1 of 2)
 Test Code: 49044005 lettuc | 01-1038-4107

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Batch ID:	12-5731-9070	Test Type:	Seedling Emergence Tier II	Analyst:	
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:	
Ending Date:	14 Feb-14 14:34	Species:	Lactuca sativa	Brine:	
Duration:	540d 15h	Source:	Burpee, NC	Age:	

Sample ID:	02-2215-5495	Code:	49044005 lettuc	Client:	EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:	
Receive Date:	14 Feb-14 14:34	Source:	Cutting Edge Formulation		
Sample Age:	NA	Station:			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-6122-8494	Mean Height	318	>318	NA	20.2%		Dunnett Multiple Comparison Test
21-2832-8421	Mean Weight	318	>318	NA	55.6%		Dunnett Multiple Comparison Test
09-6719-9923	Percent Emerged	318	>318	NA	2.8%		Mann-Whitney U Two-Sample Test
10-6982-2083	Percent Survived	318	>318	NA	2.8%		Mann-Whitney U Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	95% LCL	95% UCL	TU	Method
05-2067-8469	Mean Weight	IC5	286	N/A	312	Nonlinear Regression
		IC10	297	N/A	323	
		IC25	318	254	342	
		IC50	342	328	357	

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.55	4.61	6.49	4.7	6	0.296	0.592	10.7%	0.0%
20		4	5.7	4.39	7.01	4.7	6.7	0.41	0.821	14.4%	-2.7%
40		4	5.73	4.61	6.84	4.9	6.6	0.35	0.699	12.2%	-3.15%
80		4	6.08	5.22	6.93	5.4	6.7	0.269	0.538	8.85%	-9.46%
159		4	6.15	5.25	7.05	5.5	6.8	0.284	0.569	9.25%	-10.8%
318		4	5.35	4.24	6.46	4.4	6	0.348	0.695	13.0%	3.6%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.0214	0.0101	0.0327	0.0155	0.0305	0.00355	0.0071	33.1%	0.0%
20		4	0.025	0.0142	0.0357	0.0169	0.0333	0.00338	0.00676	27.0%	-16.7%
40		4	0.0259	0.0188	0.0331	0.023	0.0326	0.00225	0.0045	17.4%	-21.1%
80		4	0.029	0.0193	0.0387	0.0209	0.0343	0.00304	0.00607	21.0%	-35.4%
159		4	0.0329	0.0226	0.0432	0.027	0.0398	0.00323	0.00646	19.6%	-53.6%
318		4	0.0201	0.00423	0.0359	0.00934	0.0332	0.00498	0.00995	49.6%	6.25%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
20		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
40		4	1	1	1	1	1	0	0	0.0%	0.0%
80		4	1	1	1	1	1	0	0	0.0%	0.0%
159		4	1	1	1	1	1	0	0	0.0%	0.0%
318		4	1	1	1	1	1	0	0	0.0%	0.0%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
20		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
40		4	1	1	1	1	1	0	0	0.0%	0.0%
80		4	1	1	1	1	1	0	0	0.0%	0.0%
159		4	1	1	1	1	1	0	0	0.0%	0.0%
318		4	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:20 (p 2 of 2)
Test Code: 49044005 lettuc | 01-1038-4107

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6	5.9	5.6	4.7
20		4.7	5.8	6.7	5.6
40		5.8	6.6	5.6	4.9
80		5.4	6.7	6.2	6
159		5.9	6.8	6.4	5.5
318		5.7	5.3	6	4.4

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.0161	0.0236	0.0305	0.0155
20		0.0169	0.026	0.0333	0.0237
40		0.0245	0.0326	0.023	0.0236
80		0.0209	0.0279	0.0343	0.0329
159		0.0278	0.0398	0.0369	0.027
318		0.0209	0.0169	0.0332	0.00934

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
20		1	0.9	1	1
40		1	1	1	1
80		1	1	1	1
159		1	1	1	1
318		1	1	1	1

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
20		1	0.9	1	1
40		1	1	1	1
80		1	1	1	1
159		1	1	1	1
318		1	1	1	1

CETIS Summary Report

Report Date: 15 Feb-14 18:23 (p 1 of 3)
 Test Code: 49044005 cucumb | 05-7332-6553

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)				Stillmeadow, Inc.
Batch ID:	12-0198-7246	Test Type:	Seedling Emergence Tier II	Analyst:
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:
Ending Date:	14 Feb-14 13:54	Species:	Cucumis sativus	Brine:
Duration:	540d 14h	Source:	Burpee, NC	Age:
Sample ID:	00-1003-9269	Code:	49044005 cucumb	Client: EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:
Receive Date:	14 Feb-14 13:54	Source:	Cutting Edge Formulation	
Sample Age:	NA	Station:		

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-4918-6279	Mean Height	33	66	46.67	8.32%		Dunnett Multiple Comparison Test
05-8494-7821	Mean Weight	265	>265	NA	11.5%		Dunnett Multiple Comparison Test
14-0761-8295	Percent Emerged	265	>265	NA	3.97%		Mann-Whitney U Two-Sample Test
18-4687-5940	Percent Survived	265	>265	NA	3.97%		Mann-Whitney U Two-Sample Test

Point Estimate Summary							
Analysis ID	Endpoint	Level		95% LCL	95% UCL	TU	Method
18-5943-3521	Mean Height	IC5	10.9	0.00024	658		Nonlinear Regression
		IC10	1040	0.00363	155000		
		IC25	2110000	N/A	9.3E+15		
		IC50	10000000	N/A	N/A		
17-8580-6033	Percent Emerged	EC5	5.59	N/A	N/A		Linear Regression (MLE)
		EC10	1.78	N/A	N/A		
		EC25	0.264	N/A	N/A		
		EC50	0.0315	N/A	N/A		
11-6867-6730	Percent Survived	EC5	5.59	N/A	N/A		Linear Regression (MLE)
		EC10	1.78	N/A	N/A		
		EC25	0.264	N/A	N/A		
		EC50	0.0315	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 18:23 (p 2 of 3)

Test Code: 49044005 cucumb | 05-7332-6553

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.65	6.05	7.25	6.1	6.9	0.189	0.379	5.69%	0.0%
17		4	6.4	6.17	6.63	6.2	6.5	0.0707	0.141	2.21%	3.76%
33		4	6.32	5.52	7.13	5.9	6.9	0.253	0.506	8.0%	4.89%
66		4	5.82	5.67	5.98	5.7	5.9	0.0479	0.0957	1.64%	12.4%
133		4	6.35	6.05	6.65	6.2	6.6	0.0957	0.191	3.02%	4.51%
265		4	6.13	5.47	6.78	5.6	6.5	0.206	0.411	6.72%	7.89%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.124	0.109	0.139	0.115	0.137	0.00467	0.00933	7.51%	0.0%
17		4	0.133	0.126	0.139	0.129	0.138	0.00201	0.00403	3.04%	-6.71%
33		4	0.115	0.105	0.124	0.106	0.119	0.003	0.00601	5.24%	7.58%
66		4	0.142	0.124	0.161	0.132	0.159	0.0059	0.0118	8.29%	-14.7%
133		4	0.131	0.128	0.135	0.129	0.134	0.00114	0.00227	1.73%	-5.6%
265		4	0.118	0.0988	0.136	0.106	0.129	0.00589	0.0118	10.0%	5.33%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
17		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
33		4	1	1	1	1	1	0	0	0.0%	0.0%
66		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
133		4	1	1	1	1	1	0	0	0.0%	0.0%
265		4	1	1	1	1	1	0	0	0.0%	0.0%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
17		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
33		4	1	1	1	1	1	0	0	0.0%	0.0%
66		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
133		4	1	1	1	1	1	0	0	0.0%	0.0%
265		4	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 18:23 (p 3 of 3)
Test Code: 49044005 cucumb | 05-7332-6553

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.9	6.9	6.7	6.1
17		6.4	6.5	6.5	6.2
33		5.9	6.6	6.9	5.9
66		5.8	5.9	5.7	5.9
133		6.2	6.4	6.6	6.2
265		6	6.4	6.5	5.6

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.115	0.121	0.123	0.137
17		0.13	0.138	0.129	0.134
33		0.119	0.115	0.119	0.106
66		0.132	0.159	0.136	0.143
133		0.134	0.13	0.131	0.129
265		0.129	0.109	0.126	0.106

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
17		1	1	1	0.9
33		1	1	1	1
66		1	1	0.9	1
133		1	1	1	1
265		1	1	1	1

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
17		1	1	1	0.9
33		1	1	1	1
66		1	1	0.9	1
133		1	1	1	1
265		1	1	1	1

CETIS Summary Report

Report Date: 15 Feb-14 20:15 (p 1 of 2)
Test Code: 49044005 oat | 16-9087-3293

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Batch ID:	02-2267-0022	Test Type:	Seedling Emergence Tier II	Analyst:	
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:	
Ending Date:	14 Feb-14 15:17	Species:	Avena sativa	Brine:	
Duration:	540d 15h	Source:	Sprout People	Age:	

Sample ID:	19-6233-7839	Code:	49044005 oat	Client:	EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:	
Receive Date:	14 Feb-14 15:17	Source:	Cutting Edge Formulation		
Sample Age:	NA	Station:			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-6096-9872	Mean Height	345	>345	NA	13.8%		Dunnett Multiple Comparison Test
06-5064-5008	Mean Weight	345	>345	NA	27.7%		Dunnett Multiple Comparison Test
15-7911-5331	Percent Emerged	345	>345	NA	10.6%		Mann-Whitney U Two-Sample Test
05-2463-8469	Percent Survived	345	>345	NA	10.6%		Mann-Whitney U Two-Sample Test

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	26.1	23.7	28.4	24.3	27.8	0.749	1.5	5.75%	0.0%
22		4	26.1	23.8	28.5	23.9	27	0.743	1.49	5.69%	-0.29%
43		4	25.3	19.6	30.9	21.2	29.3	1.78	3.56	14.1%	2.98%
86		4	27	25.5	28.6	26.1	28.3	0.482	0.964	3.57%	-3.74%
172		4	26.6	22.3	30.9	23.4	30	1.35	2.7	10.1%	-2.21%
345		4	27.3	25.5	29.1	25.6	28	0.571	1.14	4.18%	-4.7%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.0499	0.0403	0.0596	0.0411	0.0549	0.00303	0.00607	12.2%	0.0%
22		4	0.0551	0.0495	0.0607	0.0508	0.0587	0.00176	0.00351	6.38%	-10.4%
43		4	0.054	0.037	0.0711	0.0459	0.0691	0.00536	0.0107	19.8%	-8.26%
86		4	0.0665	0.0584	0.0746	0.0591	0.0706	0.00254	0.00509	7.65%	-33.2%
172		4	0.064	0.0428	0.0851	0.0465	0.0784	0.00664	0.0133	20.8%	-28.2%
345		4	0.0651	0.0564	0.0737	0.0583	0.0713	0.00271	0.00541	8.32%	-30.3%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%
22		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	-2.7%
43		4	0.9	0.716	1	0.8	1	0.0577	0.115	12.8%	2.7%
86		4	0.925	0.845	1	0.9	1	0.025	0.05	5.41%	0.0%
172		4	1	1	1	1	1	0	0	0.0%	-8.11%
345		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	5.41%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%
22		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	-2.7%
43		4	0.9	0.716	1	0.8	1	0.0577	0.115	12.8%	2.7%
86		4	0.925	0.845	1	0.9	1	0.025	0.05	5.41%	0.0%
172		4	1	1	1	1	1	0	0	0.0%	-8.11%
345		4	0.875	0.795	0.955	0.8	0.9	0.025	0.05	5.71%	5.41%

CETIS Summary Report

Report Date: 15 Feb-14 20:15 (p 2 of 2)
Test Code: 49044005 oat | 16-9087-3293

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24.3	25.5	26.6	27.8
22		27	26.8	23.9	26.8
43		26.9	21.2	23.7	29.3
86		26.5	26.1	28.3	27.2
172		26.5	26.6	30	23.4
345		25.6	27.5	28	28

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.0411	0.0516	0.0522	0.0549
22		0.0571	0.0538	0.0508	0.0587
43		0.0545	0.0468	0.0459	0.0691
86		0.0591	0.0679	0.0706	0.0684
172		0.0679	0.063	0.0465	0.0784
345		0.064	0.0583	0.0713	0.0666

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	0.8	0.9
22		1	0.9	0.9	1
43		1	1	0.8	0.8
86		1	0.9	0.9	0.9
172		1	1	1	1
345		0.9	0.9	0.9	0.8

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	0.8	0.9
22		1	0.9	0.9	1
43		1	1	0.8	0.8
86		1	0.9	0.9	0.9
172		1	1	1	1
345		0.9	0.9	0.9	0.8

CETIS Summary Report

Report Date: 15 Feb-14 20:17 (p 1 of 3)
 Test Code: 49044005 onion | 16-7593-0135

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)				Stillmeadow, Inc.
Batch ID:	11-0958-3907	Test Type:	Seedling Emergence Tier II	Analyst:
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:
Ending Date:	14 Feb-14 15:22	Species:	Allium cepa	Brine:
Duration:	540d 15h	Source:	Burpee, NC	Age:
Sample ID:	18-9170-5003	Code:	49044005 onion	Client: EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:
Receive Date:	14 Feb-14 15:22	Source:	Cutting Edge Formulation	
Sample Age:	NA	Station:		

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-9870-7618	Mean Height	345	>345	NA	19.2%		Dunnett Multiple Comparison Test
03-3090-9306	Mean Weight	345	>345	NA	22.5%		Dunnett Multiple Comparison Test
12-0779-7103	Percent Emerged	22	43	30.76	34.0%		Dunnett Multiple Comparison Test
13-7191-5658	Percent Emerged	22	43	30.76	34.0%		Dunnett Multiple Comparison Test
02-2695-0300	Percent Survived	22	43	30.76	34.0%		Dunnett Multiple Comparison Test
18-2377-8216	Percent Survived	22	43	30.76	34.0%		Dunnett Multiple Comparison Test

Point Estimate Summary							
Analysis ID	Endpoint	Level		95% LCL	95% UCL	TU	Method
09-5109-0016	Percent Emerged	EC5	3020	N/A	N/A		Linear Regression (MLE)
		EC10	364	N/A	N/A		
		EC25	10.6	N/A	N/A		
		EC50	0.209	N/A	N/A		
03-4679-6664	Percent Survived	EC5	3020	N/A	N/A		Linear Regression (MLE)
		EC10	364	N/A	N/A		
		EC25	10.6	N/A	N/A		
		EC50	0.209	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 20:17 (p 2 of 3)
 Test Code: 49044005 onion | 16-7593-0135

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.95	5.24	6.66	5.3	6.3	0.222	0.443	7.45%	0.0%
22		4	6.03	4.56	7.49	4.8	7	0.459	0.918	15.2%	-1.26%
43		4	5.93	4.78	7.07	5.2	6.8	0.359	0.718	12.1%	0.42%
86		4	6.05	5.25	6.85	5.5	6.7	0.25	0.5	8.26%	-1.68%
172		4	6.82	5.47	8.18	5.9	7.6	0.427	0.854	12.5%	-14.7%
345		4	5.73	5.05	6.4	5.2	6.2	0.214	0.427	7.46%	3.78%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.00314	0.00283	0.00346	0.00292	0.0034	9.92E-05	0.000198	6.31%	0.0%
22		4	0.00338	0.00245	0.00431	0.00273	0.00408	0.000293	0.000586	17.3%	-7.6%
43		4	0.00295	0.00207	0.00382	0.00215	0.00336	0.000275	0.000549	18.6%	6.18%
86		4	0.00309	0.00287	0.00331	0.00293	0.00324	0.000069	0.000138	4.47%	1.64%
172		4	0.00373	0.00294	0.00452	0.00341	0.00447	0.000247	0.000495	13.3%	-18.7%
345		4	0.00364	0.00316	0.00412	0.00342	0.00408	0.000151	0.000302	8.29%	-15.8%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.85	0.758	0.942	0.8	0.9	0.0289	0.0577	6.79%	0.0%
22		4	0.8	0.616	0.984	0.7	0.9	0.0577	0.115	14.4%	5.88%
43		4	0.55	0.129	0.971	0.2	0.8	0.132	0.265	48.1%	35.3%
86		4	0.7	0.409	0.991	0.5	0.9	0.0913	0.183	26.1%	17.6%
172		4	0.725	0.486	0.964	0.6	0.9	0.075	0.15	20.7%	14.7%
345		4	0.85	0.574	1	0.6	1	0.0866	0.173	20.4%	0.0%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.85	0.758	0.942	0.8	0.9	0.0289	0.0577	6.79%	0.0%
22		4	0.8	0.616	0.984	0.7	0.9	0.0577	0.115	14.4%	5.88%
43		4	0.55	0.129	0.971	0.2	0.8	0.132	0.265	48.1%	35.3%
86		4	0.7	0.409	0.991	0.5	0.9	0.0913	0.183	26.1%	17.6%
172		4	0.725	0.486	0.964	0.6	0.9	0.075	0.15	20.7%	14.7%
345		4	0.85	0.574	1	0.6	1	0.0866	0.173	20.4%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:17 (p 3 of 3)
Test Code: 49044005 onion | 16-7593-0135

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.3	6.1	5.3	6.1
22		4.8	6.3	6	7
43		5.5	5.2	6.2	6.8
86		5.5	5.9	6.1	6.7
172		7.6	7.5	6.3	5.9
345		6.2	5.6	5.2	5.9

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.00292	0.0034	0.00309	0.00316
22		0.00273	0.0036	0.00408	0.00311
43		0.00215	0.00303	0.00325	0.00336
86		0.00293	0.00315	0.00304	0.00324
172		0.0035	0.00447	0.00341	0.00353
345		0.00353	0.00351	0.00342	0.00408

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9	0.8	0.8	0.9
22		0.7	0.9	0.9	0.7
43		0.2	0.7	0.8	0.5
86		0.8	0.6	0.5	0.9
172		0.6	0.6	0.8	0.9
345		0.9	0.9	1	0.6

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9	0.8	0.8	0.9
22		0.7	0.9	0.9	0.7
43		0.2	0.7	0.8	0.5
86		0.8	0.6	0.5	0.9
172		0.6	0.6	0.8	0.9
345		0.9	0.9	1	0.6

CETIS Summary Report

Report Date: 15 Feb-14 20:25 (p 1 of 3)
 Test Code: 49044005 soybea | 04-4182-9692

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)				Stillmeadow, Inc.	
Batch ID:	21-3457-4769	Test Type:	Seedling Emergence Tier II	Analyst:	
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:	
Ending Date:	14 Feb-14 15:04	Species:	Glycine max	Brine:	
Duration:	540d 15h	Source:	Johnny's Selected Seeds, ME	Age:	
Sample ID:	12-4094-7994	Code:	49044005 soybea	Client:	EPA OCSPP EFED
Sample Date:	23 Aug-12	Material:	Limonene	Project:	
Receive Date:	14 Feb-14 15:04	Source:	Cutting Edge Formulation		
Sample Age:	NA	Station:			

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-9738-2002	Mean Height	40	80	56.57	12.3%		Dunnett Multiple Comparison Test
11-8565-7448	Mean Height	40	80	56.57	9.52%		Williams Multiple Comparison Test
07-1396-5099	Mean Weight	318	>318	NA	21.0%		Dunnett Multiple Comparison Test
18-6702-8705	Percent Emerged	318	>318	NA	6.85%		Mann-Whitney U Two-Sample Test
16-6654-3167	Percent Survived	318	>318	NA	8.69%		Mann-Whitney U Two-Sample Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	95% LCL	95% UCL	TU	Method	
02-7008-7621	Mean Height	IC5	17.8	N/A	221	Nonlinear Regression	
		IC10	117	16.9	425		
		IC25	2700	N/A	267000		
		IC50	88500	N/A	N/A		
06-1281-4403	Mean Weight	IC5	61	N/A	267	Nonlinear Regression	
		IC10	209	12.4	747		
		IC25	1630	N/A	126000		
		IC50	16000	N/A	N/A		
08-3082-0924	Percent Emerged	EC5	17.8	N/A	N/A	Linear Regression (MLE)	
		EC10	15.5	N/A	N/A		
		EC25	12.2	N/A	N/A		
		EC50	9.43	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 20:25 (p 2 of 3)
 Test Code: 49044005 soybea | 04-4182-9692

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence) Stillmeadow, Inc.

Mean Height Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	17	15.8	18.2	16.2	18	0.379	0.759	4.47%	0.0%
20		4	18	15.2	20.9	15.7	19.9	0.885	1.77	9.8%	-6.33%
40		4	16.7	14.8	18.6	15.5	18.3	0.598	1.2	7.15%	1.47%
80		4	12.9	10.3	15.5	10.9	14.9	0.826	1.65	12.8%	24.0%
159		4	15.2	14.3	16.1	14.8	16	0.278	0.556	3.66%	10.6%
318		4	15.9	14.4	17.3	14.7	16.9	0.452	0.903	5.69%	6.48%

Mean Weight Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.324	0.259	0.388	0.263	0.348	0.0203	0.0406	12.5%	0.0%
20		4	0.344	0.293	0.395	0.307	0.385	0.0159	0.0318	9.26%	-6.22%
40		4	0.338	0.287	0.389	0.315	0.385	0.016	0.0319	9.45%	-4.31%
80		4	0.269	0.216	0.322	0.227	0.298	0.0166	0.0333	12.3%	16.8%
159		4	0.311	0.269	0.353	0.275	0.337	0.0131	0.0262	8.43%	3.93%
318		2	0.302	0.254	0.351	0.298	0.306	0.00381	0.00538	1.78%	6.66%

Percent Emerged Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	0.0%
20		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	2.56%
40		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	0.0%
80		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	0.0%
159		4	1	1	1	1	1	0	0	0.0%	-2.56%
318		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	2.56%

Percent Survived Summary											
Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	0.0%
20		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	0.0%
40		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-2.63%
80		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-2.63%
159		4	1	1	1	1	1	0	0	0.0%	-5.26%
318		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:25 (p 3 of 3)
Test Code: 49044005 soybea | 04-4182-9692

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	16.2	18	17	16.7
20		18.7	19.9	17.9	15.7
40		16.2	16.9	18.3	15.5
80		14.9	12.6	13.2	10.9
159		14.8	16	14.9	15
318		16	15.9	16.9	14.7

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.338	0.348	0.263	0.346
20		0.343	0.385	0.341	0.307
40		0.32	0.315	0.385	0.331
80		0.294	0.258	0.227	0.298
159		0.275	0.337	0.315	0.317
318				0.298	0.306

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9	1	1	1
20		1	0.9	0.9	1
40		0.9	1	1	1
80		1	0.9	1	1
159		1	1	1	1
318		1	0.9	1	0.9

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8	1	1	1
20		1	0.9	0.9	1
40		0.9	1	1	1
80		1	0.9	1	1
159		1	1	1	1
318		1	0.9	1	0.9

CETIS Summary Report

Report Date: 15 Feb-14 20:23 (p 1 of 2)
 Test Code: 49044005 ryegra | 01-8690-5403

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Batch ID: 18-6064-6414 Test Type: Seedling Emergence Tier II Analyst:
 Start Date: 23 Aug-12 Protocol: OCSPP 850.4100 Plant Seedling Emergen Diluent:
 Ending Date: 14 Feb-14 15:08 Species: Lolium perenne Brine:
 Duration: 540d 15h Source: Pennington Seed Inc. Age:

Sample ID: 15-5201-6970 Code: 49044005 ryegra Client: EPA OCSPP EFED
 Sample Date: 23 Aug-12 Material: Limonene Project:
 Receive Date: 14 Feb-14 15:08 Source: Cutting Edge Formulation
 Sample Age: NA Station:

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-3975-0140	Mean Height	318	>318	NA	13.2%		Dunnett Multiple Comparison Test
11-1529-4087	Mean Weight	318	>318	NA	24.3%		Dunnett Multiple Comparison Test
06-7846-1125	Percent Emerged	318	>318	NA	12.9%		Mann-Whitney U Two-Sample Test
13-5634-6124	Percent Survived	318	>318	NA	14.5%		Mann-Whitney U Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	95% LCL	95% UCL	TU	Method
01-5365-9584	Mean Height	IC5	32.2	N/A	16.9	Nonlinear Regression
		IC10	18.7	90.5	10.2	
		IC25	7.58	N/A	0.906	
		IC50	2.78	N/A	N/A	

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	16.6	14.3	18.8	14.6	17.8	0.714	1.43	8.62%	0.0%
20		4	15.9	13.7	18.1	14.1	17.5	0.696	1.39	8.76%	4.08%
40		4	15.6	13.9	17.2	14	16.3	0.524	1.05	6.73%	6.04%
80		4	18.1	16.9	19.3	17.5	19.2	0.389	0.779	4.3%	-9.37%
159		4	17.9	16.3	19.4	17	19.3	0.501	1	5.61%	-7.85%
318		4	16.9	14	19.7	15.5	19.3	0.902	1.8	10.7%	-1.96%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.00995	0.0082	0.0117	0.00836	0.0109	0.000552	0.0011	11.1%	0.0%
20		4	0.01	0.00784	0.0122	0.00831	0.0116	0.000683	0.00137	13.6%	-0.58%
40		4	0.0106	0.00888	0.0124	0.00918	0.0117	0.000547	0.00109	10.3%	-6.67%
80		4	0.0124	0.00981	0.015	0.0103	0.0142	0.000819	0.00164	13.2%	-24.7%
159		4	0.0111	0.00968	0.0126	0.0102	0.0121	0.000456	0.000912	8.19%	-11.9%
318		4	0.00999	0.00666	0.0133	0.00836	0.0129	0.00104	0.00209	20.9%	-0.33%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.925	0.845	1	0.9	1	0.025	0.05	5.41%	0.0%
20		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	-2.7%
40		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	-2.7%
80		4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%
159		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	-2.7%
318		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	-2.7%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.925	0.845	1	0.9	1	0.025	0.05	5.41%	0.0%
20		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	-2.7%
40		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	-2.7%
80		4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	0.0%
159		4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	-2.7%
318		4	0.925	0.686	1	0.7	1	0.075	0.15	16.2%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:23 (p 2 of 2)
Test Code: 49044005 ryegra | 01-8690-5403

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	16.4	17.8	17.4	14.6
20		15.9	14.1	16	17.5
40		15.9	16	16.3	14
80		17.5	17.6	18.1	19.2
159		17.5	17	19.3	17.6
318		15.5	15.5	17.2	19.3

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.0102	0.0104	0.0109	0.00836
20		0.0105	0.00831	0.0097	0.0116
40		0.00918	0.0104	0.0112	0.0117
80		0.0103	0.0121	0.0131	0.0142
159		0.0105	0.0102	0.0121	0.0117
318		0.00868	0.00836	0.00996	0.0129

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9	0.9	1	0.9
20		1	0.8	1	1
40		1	1	0.9	0.9
80		1	0.9	0.8	1
159		1	0.8	1	1
318		1	1	1	0.8

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9	0.9	1	0.9
20		1	0.8	1	1
40		1	1	0.9	0.9
80		1	0.9	0.8	1
159		1	0.8	1	1
318		1	1	1	0.7

CETIS Summary Report

Report Date: 15 Feb-14 20:29 (p 1 of 3)
 Test Code: 49044005 tomato | 14-3299-5121

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)				Stillmeadow, Inc.
Batch ID:	20-9725-3551	Test Type:	Seedling Emergence Tier II	Analyst:
Start Date:	23 Aug-12	Protocol:	OCSPP 850.4100 Plant Seedling Emergen	Diluent:
Ending Date:		Species:	Lycopersicon esculentum	Brine:
Duration:	NA	Source:	Burpee, NC	Age:
Sample ID:	13-2757-2229	Code:	49044005 tomato	Client:
Sample Date:	23 Aug-12	Material:	Limonene	EPA OCSPP EFED
Receive Date:		Source:	Cutting Edge Formulation	Project:
Sample Age:	NA	Station:		

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-1186-8740	Mean Height	265	>265	NA	11.6%		Dunnett Multiple Comparison Test
03-0949-8799	Mean Weight	265	>265	NA	28.7%		Dunnett Multiple Comparison Test
17-5199-8883	Percent Emerged	265	>265	NA	4.28%		Mann-Whitney U Two-Sample Test
13-6956-1533	Percent Survived	265	>265	NA	4.28%		Mann-Whitney U Two-Sample Test

Point Estimate Summary							
Analysis ID	Endpoint	Level		95% LCL	95% UCL	TU	Method
03-8886-1032	Mean Height	IC5	808	N/A	840000		Nonlinear Regression
		IC10	28000	N/A	2.22E+11		
		IC25	10500000	N/A	N/A		
		IC50	76100000	N/A	N/A		
06-4842-2123	Percent Emerged	EC5	0.445	N/A	N/A		Linear Regression (MLE)
		EC10	0.015	N/A	N/A		
		EC25	0.0000522	N/A	N/A		
		EC50	0.0000000	N/A	N/A		
14-2272-3184	Percent Survived	EC5	0.445	N/A	N/A		Linear Regression (MLE)
		EC10	0.015	N/A	N/A		
		EC25	0.0000522	N/A	N/A		
		EC50	0.0000000	N/A	N/A		

CETIS Summary Report

Report Date: 15 Feb-14 20:29 (p 2 of 3)

Test Code: 49044005 tomato | 14-3299-5121

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.18	4.76	5.59	4.8	5.4	0.131	0.263	5.08%	0.0%
17		4	5.3	4.83	5.77	5	5.6	0.147	0.294	5.55%	-2.42%
33		4	5.3	4.7	5.9	4.8	5.7	0.187	0.374	7.06%	-2.42%
66		4	4.93	4.1	5.75	4.3	5.4	0.259	0.519	10.5%	4.83%
133		4	5.13	4.52	5.73	4.8	5.5	0.189	0.377	7.37%	0.97%
265		4	5.3	5.01	5.59	5.1	5.5	0.0913	0.183	3.44%	-2.42%

Mean Weight Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.0145	0.0118	0.0172	0.0122	0.0163	0.000845	0.00169	11.7%	0.0%
17		4	0.0162	0.0145	0.0179	0.0151	0.0176	0.000533	0.00107	6.59%	-11.8%
33		4	0.0163	0.0107	0.0219	0.0112	0.0189	0.00176	0.00352	21.6%	-12.6%
66		4	0.0127	0.00835	0.0171	0.00983	0.0155	0.00138	0.00276	21.7%	12.0%
133		4	0.0171	0.0134	0.0208	0.015	0.0202	0.00116	0.00232	13.6%	-18.2%
265		4	0.017	0.013	0.021	0.0135	0.0194	0.00126	0.00252	14.8%	-17.1%

Percent Emerged Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
17		4	1	1	1	1	1	0	0	0.0%	0.0%
33		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	5.0%
66		4	1	1	1	1	1	0	0	0.0%	0.0%
133		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
265		4	1	1	1	1	1	0	0	0.0%	0.0%

Percent Survived Summary

Group	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
17		4	1	1	1	1	1	0	0	0.0%	0.0%
33		4	0.95	0.858	1	0.9	1	0.0289	0.0577	6.08%	5.0%
66		4	1	1	1	1	1	0	0	0.0%	0.0%
133		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
265		4	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date: 15 Feb-14 20:29 (p 3 of 3)
Test Code: 49044005 tomato | 14-3299-5121

OCSPP 850.4100 Terrestrial Plant Tier II (Seedling Emergence)

Stillmeadow, Inc.

Mean Height Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.3	5.4	5.2	4.8
17		5.1	5.5	5.6	5
33		5.7	5.4	5.3	4.8
66		5.4	4.3	5.3	4.7
133		4.8	5.5	5.4	4.8
265		5.1	5.5	5.4	5.2

Mean Weight Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.0146	0.0163	0.0148	0.0122
17		0.0151	0.0176	0.0161	0.016
33		0.0189	0.0184	0.0167	0.0112
66		0.0155	0.00983	0.0146	0.011
133		0.0156	0.0202	0.0177	0.015
265		0.0135	0.0194	0.0181	0.0169

Percent Emerged Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
17		1	1	1	1
33		1	0.9	0.9	1
66		1	1	1	1
133		1	0.9	1	1
265		1	1	1	1

Percent Survived Detail

Group	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
17		1	1	1	1
33		1	0.9	0.9	1
66		1	1	1	1
133		1	0.9	1	1
265		1	1	1	1